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REVIEWS OF RECENT LITERATURE.

GIARD, ALFRED. *Sur quelques types remarquables de champignons entomophytes.* Bulletin Scientifique de la France et de la Belgique, 1889; pp. 197–224. Three plates.

This articles comprises a series of notes on a number of species of entomogenous fungi the greater part of which have already been published in a communication to the Société de Biologie, and which are here republished in a fuller form and with the addition of notes.

Of the nine species mentioned eight are species named and described by himself, and four of these represent new genera. Over half of the article is devoted to the three species *Entomophthora saccharina,* Giard, *E. plusiæ,* Giard, and *E. calliphoræ,* Giard, all of which are illustrated. He has made many trials in germinating both the resting spores and conidia of *E. saccharina* and finds that the latter lose their power of germination very rapidly and by September 1 it is impossible to infect insects with them; the resting spores would not germinate either in the insects or any artificial substratum, and moreover, before spring the bodies of the infested insects containing the resting spores had become covered with the sand of the dune on which he found them. He does not attempt to answer the question as to what becomes of the resting spores or how the caterpillars are infected in the spring.

E. plusiæ came to the author's notice in 1888 on some caterpillars of Plusia gamma which were destroying a field of trefle and luzerne. He did not find the resting spores but thinks it possible that they may appear on the autumn generation of the insect, and suggests that it may be the conidial form of *E. megasperma.* Attempts to inoculate any form of Sylpha opaca failed entirely, but the author believes that the inoculation of Plusia is particularly favored by an Acridien which reproduces on the infested insects.

During the researches on *E. calliphoræ* two forms of resting spores were found, recalling both by this fact and a remarkable similarity of spores the *Basidiobolus ranarum* of Eidam. The infested Diptera were discovered to be filled with resting spores and Giard is inclined to think that the following is the history of the fungus. The resting spores are eaten with the Diptera by Batrachians. They germinate in the digestive tube and produce conidia and some resting spores on the excrementa. Here they are eaten by the Calliphora, in the bodies of which they produce resting spores incapable of germination without a change of host. The experiments necessary to demonstrate this hypothesis have not been made.

The other species described or noted are *E. forficulæ* on Forficula auricularia: *E. Fresenii,* Now., which he has transferred from the genus *Triplosporium* and considers as probably identical with *Neozygites aphidis,* Witz., *Chromostylium chrysorrheæ* Giard, *Epichlœa divisa,* Giard, *Halisaria gracilis,* Giard, and *Polyrhizium leptophyei,* Giard.

The article closes with some general observations, among which the following facts of general interest are brought out:

(1) The use of entomogenous fungi in combatting injurious insects can not be of any injury to man except as they may infect useful insects such as the silk-worm.

(2) No reliable means have yet been ascertained by which injurious insects can be combatted by *Entomophthoreæ*. The question is a more difficult one than has been supposed.—E. A. S.

MASSEE, GEORGE. *A Monograph of British Gastromycetes.* Annals of Botany, November, 1889, Vol. IV., No. XIII, pp. 1–103. Four double plates.

This monograph, which may well be used as a hand-book for collectors of British fungi, is also of interest to American students of this group.

The work contains a discussion of the group in general and of the families comprising it, which is much more readable than De Bary's description of the same as found in the translation of his Morphology and Biology of Fungi. There are also chapters on Affinities and Distribution. A table is added giving the entire list of genera, distinguishing the British ones and noting the entire number of species and numbers of British species.

Mr. Massee divides the *Gastromycetes* into the following families: *Hymenogastreæ*, *Sclerodermeæ*, *Nidularieæ*, *Podaxineæ*, *Lycoperdeæ*, and *Phalloideæ*. The first corresponds, as regards the genera included, almost exactly to Saccardo's descriptions of the same. He includes the genus *Sphanchnomyces* under *Hymenogaster*, and says that a specimen of *Pompholyx sapidum* found near Chichester is evidently a species of *Scleroderma*. He differs from Saccardo in considering the *Sclerodermeæ* as one of the primary divisions of the *Gastromycetes*, and includes in it the following genera: *Polygaster*, *Scleroderma*, *Polysaccum*, *Arachnion*, *Scoleciocarpus*, *Paurocotylis*, *Ciliciocarpus*, *Lycogalopsis*, *Glishroderma*. These are all included in Saccardo's sub-family *Sclerodermeæ* of the *Lycoperdeæ*, but do not comprise all of the genera that Saccardo assigns to the sub-family; the others are placed in the *Lycoperdeæ*.

Massee says that the *Sclerodermeæ* occupy an intermediate position between the *Hymenogastreæ* and *Lycoperdeæ*, differing from the former in not being subterranean and from the latter in the absence of the capillitium and the indehiscent peridium. The genera included in the *Nidularieæ* are the same as those of Saccardo's Sylloge.

In his table of genera he ranks the *Podaxineæ*, which Saccardo regards as a sub-family of the *Lycoperdeæ*, as a family of equal value with the latter. It contains no British genera, however. His *Lycoperdeæ*, therefore, include considerably fewer genera than Saccardo's family of the same name. He characterises it by the constant presence of a capillitium produced from the hyphæ of the trama or peridium and remaining mixed with the spores after the deliquesence of the tramal and hymenial elements. Winter's family *Tulastomei* is placed as a genus